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ABSTRACT

Since information technology amounts to half of the typical U.S. firm's capital expenditures, a key concern is how AACSB (American Assembly of Collegiate Schools of Business)-accredited MBA (Masters of Business Administration) programs are educating their rising executives in technology management. This study details a content analysis of 45 syllabi used in the required information technology course in AACSB-accredited MBA programs. Elements analyzed include course name, texts or required readings, assessment methods and weights, the proportion of assessment linked to team work, and course topics. Topics are compared to critical issues in technology management identified by both CEOs (Chief Executive Officers) and CIOs (Chief Information Officers) in recent surveys. The study may be used by accredited schools and those seeking accreditation to benchmark their own required MBA information technology course. Appendices include a list of participating colleges and universities, and tables that present data on textbooks, assessment methods, teamwork percentages, and course topics. (MES)

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INFORMATION TECHNOLOGY MANAGEMENT FOR RISING EXECUTIVES: MBA CURRICULUMS AT AACSB ACCREDITED SCHOOLS

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According to Peter Keen (1991), every business manager must be able to manage information technology. Since information technology amounts to half of the typical U.S. firm's capital expenditures, a key concern is how AACSB-accredited MBA programs are educating their rising executives in technology management. This study details a content analysis of forty-five syllabi used in the required information technology course in AACSB accredited MBA programs. Topics are compared to critical issues in technology management identified by both CEOs and CIOs. The study may be used by accredited schools and those seeking accreditation to benchmark their own required MBA information technology course.

INTRODUCTION

Changes in information technology (IT) during the past decade have caused changes in IT management, in marketable IT skills, and in MIS curriculums. During this decade, business organizations have become increasingly dependant upon information technology as an integral part of every functional area. "Half of the CEOs and boards of directors of the world's largest companies now consider information technology when they develop corporate strategies, according to a survey of 100 such executives by management consulting firm A.T. Kearney" (Scheier, 1997, 86). According to a vice president at this consulting firm, "Technology is considered too critical to success to be left solely in the hands of technologists" (Scheier, 1997, 86). Executives now look to technology not just to reduce cost, but to drive growth (Stedman, 1997). The 500 U.S. companies with the highest revenue spend more than $100 billion on information technology (Alter, 1997, 74). Therefore, effective technology management has become a critical skill for the general business manager. According to Deloitte & Touche's Survey of American Business Leaders, including 150 senior executives, "information systems is an investment, say 83% of respondents, rather than a cost to be managed" (Alter, 1996, 90). Ninety-three percent of these executives have PCs on their desks (Alter, 1996, 90).

Knowing how to solve problems and capture opportunities using appropriate IT are critical success factors for any MBA graduate; yet,an information technology or MIS course is not part of the required core at many AACSB accredited schools. Further, MIS is a hybrid discipline whose curriculum continues to lack the standardization of many older business disciplines. This study examines the required MIS or information technology management course in sixteen AACSB accredited MBA programs. A major research concern is whether these required courses share discernible common attributes. Other research questions are as follows:

- What is the course called?
- What are the texts or required readings?
- What are the common assessment methods and weights?
- What percent of the total evaluation is linked to teamwork?
- What are the common topics covered?
- How do these topics compare to those critical issues identified by CIOs and CEOs?

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- What improvements can be made in the required MIS MBA course based on lessons learned from this analysis?

METHODOLOGY

A combination of phone calls, e-mails, faxes, and web sites was used to obtain syllabi. First, we used a combination of phone calls and follow-up e-mails to solicit syllabi from twelve selected schools. We received three (25% response rate) syllabi from this first effort. Then, we used the survey strategy recommended by Professor Max Burns from Georgia Southern University (1998). We sent a fax to seventy-three AACSB (1997-98) accredited schools requesting a copy of the syllabus for the required MIS or information technology management course in their MBA program. Three working days later, a second fax labelled "second request" was sent to all non-responding schools. We received twenty-six responses (36% response rate) and were able to use thirteen syllabi. At this point, a pilot study was conducted (Stephens, 1998). Subsequently, the IS World web site solicited MIS syllabi and we used twelve syllabi posted to this site. For the forty-seven remaining accredited programs, we sent a fax to each Dean's office asking for the name of the professor responsible for this course. We then e-mailed each professor and requested a syllabus. We received thirteen complete syllabi (28% response rate) from these personal e-mails. Finally, we requested syllabi from a listserve and received four syllabi not already available to us. We did receive responses from some schools indicating that no such course was required. Some responses indicated that an integrated curriculum made the elements of analysis for our study impossible to identify. We indicated in our communications that we would share the results of our study. Schools participating in our study are listed alphabetically in Appendix A.

The following elements were analyzed on each of the forty-five syllabi: course name, texts or required readings, assessment methods and weights, the proportion of assessment linked to team work, and course topics. Topics were then compared to recent CIO and CEO surveys on critical IT management issues.

Course Name

The required course lacked a common name (Appendix A). A total of thirty different names were used by the forty-five schools for the required course. "Management Information Systems" was used by nine schools and "Introduction to Management Information Systems," by three for a total of twelve schools using the MIS title for the course. "Information Systems" was used by four schools.

Required Readings and Texts

Just as course names lack standardization, so did texts used (Appendix B). Applegate, McFarlan, and McKenney's *Corporate Information Systems Management: Texts and Cases* was the most frequently used text with eight schools requiring this text. Alter's *Information Systems* was used by four schools and Cash, Eccles, Nohria, and Nolan's *Building the Information Age Organization* was used by three schools. Appendix B provides an alphabetical listing by frequency of all texts used by the forty-five schools. Reading packets were commonly required and some schools required only these packets. Some schools required more than one text.

Assessment Methods and Weights

The following assessment methods were used by these schools: exams, quizzes, case study analyses, research papers or topic studies, computer-based projects, class participation, reports on reading of articles and/or books, and other daily assignments. One school used the journal method extensively. This exception was included under reports.

All but five of the schools used examinations with the average weight being 46% of the course grade (Appendix C). Weights ranged from 20% to 100%. The 84% of the courses using exams averaged two exams per term. The maximum number given was four and the minimum was one. The second most frequently used assessment method was class participation with twenty-seven of the courses or 60% using participation for an average of 18% of the course grade. The range was from 5% to 50%. Examinations and class participation, then, accounted for two-thirds (64%) of course assessment on average. Only seven courses used quizzes as an assessment component. Slightly more than half of the professors (53%) used case studies and on average, weighted case study work at 23% of the course grade. Research papers or topic studies were also employed by slightly more than half the professors (51%) with the average weight being 23% as well. Thirteen professors of the 44 reporting grade weights (30%) used both case studies and a paper in the MBA course. Computer-based projects were used for assessment in 42% of the schools as were graded assignments. Reports on journal articles and books or keeping a weekly journal based on class and readings was a requirement in only six courses. The assessments methods ranked by frequency of use were as follows:

- Exams (typically 2 at about 20-25% each)
- Class participation
- Case studies
- Research paper or topic study
- Computer-based project and Assignments (tie)
- Quizzes
- Reports (books, articles, create own journal)

Not all syllabi specified the requirements for class participation, case study analysis and presentation, research paper, projects, and assignments. However, some syllabi specified each in great detail. One syllabus specified the method for scoring participation on a 1 to 5 scale. One syllabus offered a special assignment for those who would rather not speak out in class. Interestingly, none of the courses required students to write case studies.

Teamwork Component

Over half the courses (55%) required teamwork; on average, weighted team assignments accounted for 33% of the course grade (Appendix D). Computer-based projects were the most common team assignment (12 schools), followed by cases (10) and topic studies or research papers (9). Teamwork on cases typically contributed 25% of the course grade; research papers or topic studies completed as a team, 19%; computer-based projects, 25%. Two schools had team assignments and one school used teams for article reports/presentations.

Topic Categories

Topics were taken from the listings available on the syllabi. Therefore, a syllabus which provided a more detailed listing is better represented than one which provided major topics only. While actual course content may have covered a topic, only topics explicitly listed in the topics list or course schedule were used for the analysis. Some of the more detailed topics overlap with broader topics. For example, collaberative work overlaps with decision support which includes group support. Acquisition/implementation issues are a subset of the broader systems development process topic. Client/server may not have been listed in some courses but discussed under the broader topic of IT architecture.

As a precise indicator of course content, the topic analysis is flawed; however, the analysis does provide an overview of course content. Fifty percent or more of these courses listed the following seven topics (Appendix E):

1. strategic applications of IT
2. information age organization: IT design and management
3. systems development process (planning, building, managing)
4. IT architecture and infrastructure
5. telecommunications fundamentals
6. IT enabled process redesign
7. types of systems and evolution of IT (TPS, DSS, GDSS, EIS, ES, etc.)

Almost fifty percent included electronic commerce and database fundamentals as a main topic. Other major topics listed (Appendix E) were:

- decision support
- interorganizational systems/strategic alliances
- fundamentals of HW and SW.

Twenty-five percent of responding professors listed security/privacy, information resource management, ethical issues, and thehuman side of technology/the individual and IT as separate topics.

Comparison of Topics to CIO/CEO Issues

CEOs and IT executives or CIOs surveyed placed importance on incorporating IT in strategic planning (Scheier, 1997; Schurr, 1997). Senior executives are also investing heavily in IT infrastructure and using this infrastructure to compete globally (Alter, 1996). These two concerns are clearly reflected in the number one topic: strategic applications of IT. Another executive concern, using IT to grow sales (Stedman, 1997), may be embedded in strategic applications but is clearly shown in the attention to electronic commerce by 21 schools. Global systems appears as a specific topic on 11 syllabi. IT infrastructure tied for third as the most frequently listed topic (27 schools).

A Deloitte & Touche survey of 431 North American CIOs (1996) identified the following issues as key ones for CIOs:

- Client/server architecture and networking: the percentage of firms using client/server is now greater than those not and expenditures are expected to grow. Visual Basic was "identified most often by CIOs as an

important client development tool." However, mainframe purchases and upgrades exceeded all other platforms (http://www.dttus.com/publications/cio/key.htm, 1996,1).

- Business process reengineering or redesign
- Replacing legacy systems
- Outsourcing (particularly the disaster recovery function)
- Integrating domestic and international systems within the organization or global systems
- Electronic commerce
- Purchasing commercial off-the-shelf software

The key issues identified by CIOs are, for the most part, represented in the syllabi studied. The shift in IT architecture and infrastructure appears as a major topic in a majority of syllabi (Appendix E). Related topics include interorganizational systems, telecommunications and database fundamentals, data warehousing, and of course, the specific topic client/server. Business process redesign is a major topic in half the syllabi, with electronic commerce appearing on 21 syllabi. However, outsourcing, replacing legacy systems, and integrating domestic and international systems -- all specified as key issues in the Deloitte and Touche survey -- appear infrequently or not at all on the syllabi.

According to CIOs in another survey, the most important issue was building a responsive IT infrastructure (Brancheau, Janz, Wetherbe, 1996). This issue was one of the top three topics on MBA syllabi. Other issues identified in order of importance were as follows:

1. IT infrastructure
2. Business process redesign (reengineering)
3. Distributed systems
4. Information architecture
5. Communications network
6. Software development
7. Information resource management
8. IS human resources
9. Aligning IS with the enterprise
10. IS strategic planning
11. Collaberative systems
12. Measuring IS performance
13. IS role/value to organization
14. Organizational learning
15. Legacy applications
16. End user computing
17. IS for competitive advantage
18. System integration
19. Electronic data interchange (EDI)
20. Outsourcing

Comparing this list of important issues to the topic analysis (Appendix E), the topics not well represented appear to be IS human resources, measuring IS performance, IS role/value to the organization, legacy applications, end user computing, and system integration.

Potential Improvements

Considering the topics covered and the critical issues according to senior executives, the course might best be called the "Management of Information Technology." Since strategic use of IT requires attention to multiple perspectives, teamwork in the MBA course seems appropriate for a significant portion of the course. For computer-based projects, Visual Basic might be an excellent choice for some project teams. Textbooks which include strategic applications but also include good coverage of client/server architecture, evaluation and integration of purchased software, global systems integration and support, electronic commerce, and outsourcing would be helpful. Clearly, the courses studied are very different, suggesting the possible need for two courses:

(1) Foundations in Information Technology: technology fundamentals and architectures, computer-based projects
(2) Management of Information Technology: strategic applications, organizational and process redesign with IT, with case studies and topic studies.

Educating future executives in information technology appears to have a positive impact on the performance of an organization. One CEO survey indicated that CEOs and other top managers who are comfortable with technology initiate one third of the IT projects in their organizations while those who are not initiate fewer than 15% (Caldwell, 1997, 100).

Further Research

Some questions not pursued are, "How does the mission of the business school affect the IT course?" Is the course taught differently at universities with a "research" mission than at universities with a "teaching" mission? A grouping

of topics into topic clusters would improve the topic analysis. Further, after sharing work thus far, the authors hope to encourage other professors to share syllabi and have an even larger number of syllabi available for review. Finally, on the basis of the content analysis, a survey could be formulated which might more accurately assess course content and employ a larger sample size.

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APPENDIX A
PARTICIPATING COLLEGES AND UNIVERSITIES

School	Course Name	Syllabus Date
Appalachian State University	Information Systems for Planning and Control	Summer 1998
Arizona State University West	Introduction to MIS	Fall 1997
Auburn University	Introduction to the Management of Information Technology	Winter 1998
Ball State University	Management Information Systems	not given
Bentley College	Information Technology in the Business Environment	Spring 1998
California State University, San Marcos	Management Decision Making and Analysis (MIS)	Summer 1996
Clemson University	Information System Design and Implementation	Fall 1997
Cloud State University	Management Information Systems	Spring 1998
DePaul University	Management of Information Technology	Winter 1997

School	Course Name	Syllabus Date
East Carolina University	no name given on syllabus	Spring 1998
Emory University	Information Technology and Decision Support	Spring 1996
Florida Atlantic University	Introduction to Management Information Systems	Fall 1998
Florida International University	Organizational Information Systems	Spring 1998
Georgia Southern University	Fundamentals of Computer Information Systems	Spring 1996
Georgia College and State University	Information Resource Management	Fall 1998
James Madison University	Management Information Systems	Spring 1997
Michigan State University	Enterprise Information Systems	Spring 1998
Mississippi State University	Management Information Systems	Summer 1997
New York University	IT and Organizations	Fall 1997
Northeastern University	Information Resource Management	Fall 1998
Southern Methodist University	Managing Information Technology	Fall 1997
Texas Christian University	Managing with Information Technology	Spring 1998
University of North Florida	Management of Information Technology	Fall 1998
University of Georgia	Information Systems Management	Fall 1998
University of Baltimore	Information Systems and Technology	Spring 1998
University of Cincinnati	Information Systems for Managers	Fall 1995
University of Maryland at College Park	Strategic Information Systems	Fall 1996
University of Missouri	Management Information Systems	Fall 1997
University of Kentucky, Lexington	Management of Information Resources	Summer 1998
University of Missouri, Kansas City	Management Information Systems	Fall 1998
University of Missouri, St. Louis	Management Information Systems	Fall 1998
University of West Georgia	Strategic Management of Information Technology	Spring 1996
University of Alabama at Birmingham	Management Information Systems	Fall 1996
University of Alabama in Huntsville	Seminar on the Management of Information Technology	Spring 1998
University of Colorado at Colorado Springs	Information Systems Concepts	Spring 1998

School	Course Name	Syllabus Date
University of Houston	Information Systems	Spring 1998
University of California, Los Angeles	Information Systems	Spring 1998
University of South Carolina	Information Systems	Fall 1997
University of Utah	Introduction to Information Systems	Fall 1997
University of Kansas	Managerial Information Systems	Spring 1997
University of New Mexico	Introduction to MIS	Spring 1997
University of Pittsburg	Information Systems	Spring 1997
Western Carolina University	Decision Support Systems	Spring 1998
Wright State University	Information, Technology, and Organizations	Fall 1997

APPENDIX B
TEXTBOOKS

Total	Textbook	Schools
8	Applegate, McFarlan & McKenney. Corporate Information Systems Management: Texts and Cases, 4th ed. Irwin, 1996	2,4,24,32,35, 38,39,41
4	Alter, Information Systems, 2nd ed	15, 29,44,21
3	Cash, Eccles, Nohria & Nolan. Building the Information Age Organization, Control and Information Technologies	5,12,17,
2	Laudon and Laudon. Essentials of Management Information Systems: Organization and Technology, 1997.	8,11
2	Lucas. Information Technology for Management. McGraw-Hill, 1997.	13,24
2	Martin, Hoffer, et al. Managing Information Technology: What Managers Need to Know, 2nd ed. MacMillan.	3,26
2	McKeown and Watson, Metamorphosis.	15,27
2	Morgan, Application Cases in MIS, 2nd ed., 1996.	4,36
2	O'Brien. Introduction to IS, 8th ed. Irwin	7,46
2	Stair and Reynolds. Prinicples of Information Systems: A Managerial Approach. Course Technology, 1998.	6,40
2	Turban, McLean, Wetherbe. IT for Management, 1996 and 1999.	22,33

Total	Textbook	Schools
1	Cats-Baril and Thompson, Information Technology and Management, Irwin, 1997.	10
1	Cook. Building Enterprise Information Architectures. Prentice Hall.	
1	Hansen and Hansen, Database Management and Design, Prentice Hall, 1996.	9
1	Harvard Business School Casebook, Managing in an Information Age	43
1	Hatfield. Developing PowerBuilder 5 Applications. Sams Publishing, 1996.	9
1	Kallman and Grillo. Ethical Decision Making and IT. McGraw-Hill, 1996.	30
1	Laudon and Laudon. Management Information Systems, 1996.	22
1	McNurlin and Sprague. IS Management in Practice. Prentice Hall.	36
1	Parker and Case. MIS, 1989	28
1	Post and Anderson. MIS. Irwin, 1997	30
1	Reynolds. IS for Managers, 1995	20
1	Siegel. Teach Yourself Access 97. MIS Press	43
1	Burgelman, Maidique, Wheelwright, Strategic Management of Technology and Innovation. Irwin, 1997.	47
1	Applegate. Managing in an Information Age. 1996	25
1	Wall Street Journal	43
1	Willicocks, Feeny, Islei. Managing IT as a Strategic Resource. McGraw-Hill, 1997	34

APPENDIX C
ASSESSMENT METHODS BY PERCENT OF TOTAL

School	Exams	No.	Quiz	Cases	Research/ Topic Study	Project	Participa-tion	Report	Assignment
2	30	1	20	15	20	10	5		
3	30	2		20	20		30		
4	35	2		24	12	17	12		
5	25	1		40		20		15	
6	45	2	20			15			20
7	40	3	25						35
8	35	2		15	15	30	5		
9	63	2			5	24			8
10	100	3							

School	Exams	No.	Quiz	Cases	Research/ Topic Study	Project	Participa-tion	Report	Assignment
11	45	3				20			35
12	50	2		30	20				
13	20	2		20			10	20	30
15	70	2			15		5		10
16	50	1					50		
17	50	2		25	25				
18	80	2					20		
19	40	2				35	20	5	
20	50	2		8	18			24	
21	30	1		25	45				
22	80	4							20
23	50	2		30	10				10
24	50	2		25			12.5	12.5	
25	25	1		25	25		10		15
26	40	2			35	15	10		
27	40	1			25	25	10		
28	80	4					10		10
29			25	25	25		25		
30	40	2	5	20		20	10		5
31					50		50		
32				25	30		20		25
33	75	3			12.5				12.5
34	20	1	30		30				20
35				20		30			50
*36									
37				20	10		40		30
38				30	30	30	10		
39	25	1		40			35		
40	55	2			25	20			
41	40	1		25			10		25
42	50	2	30	8			12		
43	30	2		20		10	15		25
44	60	3				30	10		
45	25	1		20		30	15		10
46	37	2				63			
47	20	1			20	30	15	15	
Average	??	??	??	??	??	??	??	??	??
Std. Dev	19.33	0.8	8.59	7.79	10.88	11.81	12.76	6.51	11.7
Number	38	38	7	24	23	19	27	6	19
Max	100	4	30	40	50	63	50	24	50
Min	20	1	20	15	5	10	5	5	8

School	Exams	No.	Quiz	Cases	Research/ Topic Study	Project	Participa-tion	Report	Assignment
Used by	84%		16%	53%	51%	42%	60%	13%	42%

*no grading data

APPENDIX D
TEAMWORK PERCENT

School	Total	Cases	Research	Project	Reports	Assignments
2	20		20			
3						
4	24	24				
5	60	25		20	15	
6	10			10		
7						
8	60	15	15	30		
9	29		5	24		
10						
11	55			20		35
12						
13						
15	15		15			
16						
17						
18						
19	35			35		
20						
21						
22						
23	10		10			
24						
25	50	25	25			
26	15			15		
27	50		25	25		
28						
29						
30	40	20		20		
31						
32	25	25				
33						
34	30		30			
35						
36						

School	Total	Cases	Research	Project	Reports	Assignments
37						
38	30	30				
39	40	40				
40	25		25			
41	25	25				
42						
43						
44	10					10
45	50	20		30		
46	45			45		
47	30			30		
Average	32.63	24.9	18.89	25.33	15	22.5
Number	24	10	9	12	1	2
% of total(44)	55%	23%	20%	27%	2%	5%
Max	60	40	30	45	15	35
Min	10	15	5	10	15	10

APPENDIX E
COURSE TOPICS

Total	Topics	Schools
32	strategic applications of IT	2,3,4,7,8,10,11,13,15,16, 19,21,22,23,24,25.26,27,28,29, 31,32,33,34,36,37,39,41,42,43, 45,47
28	information age organization: IT design and management	3,5,7,11,12,13,15,17,18,19,22, 23,24,25,26,30,31,32,33,34,35, 36,39,41,42,43,45,47
27	systems development process (planning, building, managing)	4,6,7,8,9,10,11,13,15,20,22,23, 24,25,26,28,29,33,34,37,38,39, 43,44,45,46,47
27	IT architecture and infrastructure	2,3,5,6,8,12,13,15,17,18,22,23, 24,25,26,27,32,33,35,36,37,39, 41,42,43,45,47
25	telecommunications fundamentals	2,7,8,10,11,13,15,17,20,21,22,23 24,26,28,31,33,35,37,38,39,42, 43,44,45
24	IT enabled process redesign	2,5,7,10,13,15,17,18,19,22,23, 24,25,26,27,33,34,35,36,39,41, 42,43,47

Total	Topics	Schools
23	types of systems and evolution of IT (TPS, DSS, GDSS, EIS, ES, etc.)	2,5,6,7,8,13,18,20,21,22,24,26, 29,30,31,33,37,38,39,42,43,44, 46
21	electronic commerce	2,5,8,10,16,18,19,23,25,26,27,29 31,32,33,35,39,41,42,45,46
21	database fundamentals	2,6,7,9,13,15,20,21,22,23,26,28, 29,30,33,35,38,39,43,44,46
17	decision support (individual, group, organizational)	4,5,10,13,15,17,18,22,23,24,26, 28,33,37,38,41,44
16	interorganizational systems/strategic alliances	2,5,8,12,13,15,17,24,25,26,31, 32,33,35,36,41
15	fundamentals of HW and SW	2,7,13,15,18,20,22,23,24,26,28, 35,38,39,43
13	security/privacy	5,7,9,16,19,20,22,26,33,39,42,44 ,46
12	information resource management	4,10,11,12,13,19,23,26,33,37,42, 45
12	ethical issues	7,12,15,19,23,26,30,39,43,44,46, 47
12	human side of technology/the individual and IT	4,5,15,17,18,23,26,31,37,39,42, 44
11	global systems	2,12,15,21,23,24,25,26,32,36,45
10	outsourcing	2,5,19,25,27,29,34,42,45,47
8	client/server	2,9,18,25,29,34,42,45
8	managing IT risks	5,12,5,16,21,25,26,34
7	acquisition/implementation issues	5,16,20,24,25,27,34
6	frameworks for IT enablement	5,6,8,15,24,25
6	justifying IT investments	5,12,25,33,41,44
6	emerging technologies/web technologies	16,23,25,26,27,43
6	future impacts of IT	2,12,15,17,26,42
6	data modeling	6,9,11,13,21,23
6	IT and productivity	10,13,18,25,30,34
4	managing IT function/role of CIO	32,32,39,47
4	PC applications: database	4,6,8,11

Total	Topics	Schools
3	end user computing	4,20,46
3	collaborative work	18,42,43
3	system failures	2,16,25
2	data warehousing	13,18
2	PC Applications: building a web page	8,11
2	knowledge management	31,42
2	IS career/personnel issues	10,20,
2	disaster recovery/planning	15,20
1	multimedia	16
1	PC applications: PowerBuilder	9
1	project management	5
1	TQM & IS	31
1	PC applications: spreadsheet	4
1	electronic document management	37